Course Description

This course presents and applies the web programming languages (HTML, DHTML, Javascript, Coldfusion), tools, and techniques used to develop professional web sites. The course moves step-by-step through the processes involved in planning, designing, launching, and maintaining successful web sites, with an emphasis on teamwork.

Teaching Procedures

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:

Gerardus Blokdyk, *Web Application Design A Complete Guide - 2019 Edition,* ISBN-13: 9780655843061.

Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Homework …….. 20%
Final Project …… 15%

Midterm …… 30%
Final …….. 35%

No makeup exams!!!

The course grades are assigned as:

90 – 100% = A-
80 – 89% = B
70 – 79% = C
60 – 69% = D
Below 60% = F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of "A" (or "F".) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Course Schedule:

Week	Topics	Reading	Assignments
1	Web Fundamentals, Programming Languages for the Web	Chapters 1 and 2	
2	HTML Basics, the working environment The PHP language	Chapters 3 and 4 Chapter 5 and 6	File browser v1.0, indexer v1.0
3	More on the PHP language	Chapter 7	
4	Using HTML with PHP, forms, sessions, cookies, etc. Using CSS and templates. Intro to databases	Chapter 9 Chapter 10 and 11	File Browser v2.0, indexer v2.0
5	Database manipulation in PHP	Chapter 12 and 13	Indexer v3.0
6	Midterm Exam		
7	Basics of JavaScript	Chapter 14	Indexer 4.0+Searcher; final project proposal due

8	Programming the browser and forms with JavaScript Manipulating windows and frames with JavaScript	Chapter 15 and 16	
9	Using dates, timers, string manipulation and regular expressions	Chapter 17	
10	DHTML AJAX basics	Chapter 18	
11	Security pitfalls and basic solutions (SQL injections, HTML/JS injections, X-site scripting, DoS, DDoS, File upload vulnerabilities, Password encryption, Password recovery flaws)	Chapters 8 and 19	Final project CEO presentation
12	Final Exam		

Term Paper:

Term paper requires students to write a report for "Web Site Development Checkpoints: Website". Websites provide organizations with a valuable tool for the presenting a face to the entire world few successful businesses can survive today with having a professional-looking and functional website (Lucas). This paper is to analyze the resolve of a company's web site whether or not it achieve the purpose it intend. Web-Site development checkpoints is the process of collecting and linking information about a specific web page. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

Classroom Policies:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

Attendance, Absence, Lateness, Incomplete:

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Course Outcome:

At the end of this course the successful student will be able to:

- apply a structured approach to identifying needs, interests, and functionality of a website.
- design dynamic websites that meet specified needs and interests.
- write well-structured, easily maintained, standards-compliant, accessible HTML code.
- write well-structured, easily maintained, standards-compliant CSS code to present HTML pages in different ways.
- use JavaScript to add dynamic content to pages.
- critique JavaScript code written by others, identifying examples of both good and bad practice.

Moodle Forum:

We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a "0" on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

The Learning Environment:

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Board have established the following expectations for learning.

- All backgrounds and cultures are respected.
- During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.
- All members of the class arrive on time and leave the class only on breaks or in case of emergency.
- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
- Consideration is always given to other classes that are taking place in adjoining classrooms.
- At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

Reagan National University Library Services:

RNU's online collection contains over 60,000 volumes comprised of books, journals, videos, and faculty created resources. The Library Research Portal (library@rnu.edu) provides access to multiple services and authoritative resources for academic research including books, articles, texts, visual media, and teaching resources. Appropriate sources include scholarly and peer-reviewed journal articles, scholarly books, and well-respected news magazines and newspapers. The Library offers a large number of appropriate sources and each student is required to attend an online Library orientation. Assistance is available to help students select and locate appropriate sources when RNU is open. The online library is available to students 24 hours 7 days a week. All students can connect to the online library through the computers and laptops available at home and on campus. Each student must use their own pass code to access the library.

As an RNU student, you are required to use the RNU online library, as one source, to assist you in completing a required research paper or project.

Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 417
Course Title:	Object-Oriented Programming
Credit Hours:	3
Prerequisite:	CSC 122
Term:	SP 2019
Class Time:	W 9:00 – 12:45
Class Room:	1
Instructor:	[redacted]
Office Hours:	M TU 11:00 AM – 1:00 P. M.
Telephone:	
E-Mail:	[redacted]

Course Description

Advanced use of an object-oriented programming language in the implementation of object-oriented systems. The language is studied in depth to see how advanced concepts are realized in the language, and is used to produce example systems. Emphasis is placed on the most recent advanced features.

Teaching Procedures

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:

Intro to Java Programming, Comprehensive Version, 11th Edition by Y. Daniel Liang Published by Prentice Hall Copyright © 2017, ISBN: 978-0134611037

Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Homework Assignments …….. 20%
Term Paper …….. 20%

Midterm …… 30%
Final …….. 30%

No makeup exams!!!

The course grades are assigned as:

90 – 100% = A-
80 – 89% = B
70 – 79% = C
60 – 69% = D
Below 60% = F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of "A" (or "F".) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Course Schedule:

Week	Topics	Reading	Assignments
1	Introduction to Object Oriented Programming, Basic elements	Chapters 1 and 2	Assignment 1
2	Program control, Operators, Basic UML	Chapters 3, 4, 5, 9	Assignment 2 (assignment 1 due)
3	Initialization and clean-up, I/O, Arrays, ArrayList, Composition, Implementation hiding	Chapter 7, 8, 9, 10	Assignment 3 (assignment 2 due)
4	Inheritance & Polymorphism Upcasting & Downcasting Interfaces, Abstract Classes & Polymorphism	Chapter 11, 13	
5	Database manipulation in PHP	Chapter 12 and 13	Assignment 4 (assignment 3 due)
6	Midterm Exam		
7	Review, GITHUB workshop	Chapter 12, 17	(Assignment 4 due)

	Some Java I/0		
8	JAVA I/O and Exceptions, JDBC	Chapter 32	Assignment 5
9	GUI development, JavaFX, Inner Classes and Lambda Expressions	Chapter 14, 15, 16	(Assignment 5 due)
10	The Collections Framework, Data Structures & Algorithms The Collections Framework, Data structures & Algorithms	Chapter 20, 21 Chapter 22, 24	Assignment 6
11	Concurrency & Multithreading Design Patterns, Localization	Chapters 30, 36	
12	Final Exam		Assignment 7 (Assignment 6 due)

Term Paper:

Term paper requires students to write a report for "THE ADVANTAGES OF OBJECT-ORIENTED PROGRAMMING USING C++". Object-oriented programming is a new way of approaching the job of programming. Programming over the years has evolved to accommodate the increased complexity of programs. (1) Structured, easy to understand programming has been around since the late 60's. These advances allowed programmers to write fairly complex programs relatively easy using such languages as C and Pascal. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

Classroom Policies:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

Attendance, Absence, Lateness, Incomplete:

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Course Outcome:

At the end of this course the successful student will be able to:

- To understand Object Oriented Programming concepts
- To understand the role that methods play in an object-oriented program
- To understand the concept of a class hierarchy.
- To know the basic characteristics of Java
- To become familiar with the relationship between classes and objects in a Java program
- To comprehend Java Data and Control Structures
- To understand the difference between a Java application and a Java applet.

Moodle Forum:

We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a "0" on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

The Learning Environment:

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- During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.

- All members of the class arrive on time and leave the class only on breaks or in case of emergency.
- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
- Consideration is always given to other classes that are taking place in adjoining classrooms.
- At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

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RNU's online collection contains over 60,000 volumes comprised of books, journals, videos, and faculty created resources. The Library Research Portal (library@rnu.edu) provides access to multiple services and authoritative resources for academic research including books, articles, texts, visual media, and teaching resources. Appropriate sources include scholarly and peer-reviewed journal articles, scholarly books, and well-respected news magazines and newspapers. The Library offers a large number of appropriate sources and each student is required to attend an online Library orientation. Assistance is available to help students select and locate appropriate sources when RNU is open. The online library is available to students 24 hours 7 days a week. All students can connect to the online library through the computers and laptops available at home and on campus. Each student must use their own pass code to access the library.

As an RNU student, you are required to use the RNU online library, as one source, to assist you in completing a required research paper or project.

Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 420
Course Title:	Image Processing
Credit Hours:	3
Prerequisite:	CSC 122
Term:	SU 2018
Class Time:	W 9:00 – 12:45
Class Room:	1
Instructor:	[redacted]
Office Hours:	M TU 11:00 AM – 1:00 P. M.
Telephone:	
E-Mail:	[redacted]

Course Description

This course introduces principle techniques and fundamental algorithms used to manipulate digital image imagery in the spatial and frequency domains. Topics covered in this course include: image sampling, quantization and representation, image enhancement (histogram equalization), filtering (sharping, blurring and noise), image transformation, segmentation and color. Several assignments will be given requiring students to process digital images using techniques discussed in class. Software used in this course includes the use of Python and MATLAB.

Teaching Procedures

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:

Gonzales/ Woods/ Eddins, *Digital Image Processing using, 4th edition,* Gatesmark Publishing, *ISBN 978-0-13-335672-4*

Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Homework Assignments …….. 20%
Midterm …… 40%
Final …….. 40%

No makeup exams!!!

The course grades are assigned as:

90 – 100% = A-
80 – 89% = B
70 – 79% = C
60 – 69% = D
Below 60% = F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of "A" (or "F".) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Course Schedule:

Week	Topics
1	**Introduction to the digital image** Why digital images? The (film and) digital camera. Data types and 2d representation of digital images.
2	**Characteristics of grey-level digital images** Discrete sampling model. Quantization. Noise processes. Image attributes
3	**Segmentation** Thresholding and thresholding algorithms. Performance evaluation and ROC analysis. Connected components labelling.

	Region growing and region adjacency graph (RAG). Split and merge algorithms.
4	**Image transformations** Grey level transformations. Histogram equalization. Geometric transformations. Affine transformations. Polynomial warps
5	**Morphological operation** Erode and dilate as max and min operators on binary images. Open, close, thinning and other transforms. Medial axis transform. Introduction to grey-level morphology.
6	Midterm Exam
7	**Image filtering** Fourier descriptors. Linear and non-linear filtering operations. Image convolutions. Separable convolutions. Sub-sampling and interpolation as convolution operations.
8	**FFeature characterization** Calculation of region properties. Moment features. Boundary coding line descriptors from boundary coding and from moments. Image search and multi-resolution algorithms.
9	**EEdge and corner detection** Edge enhancement by differentiation. Effect of noise, edge detection and Canny implementation. Edge detector performance evaluation. Image structure tensor. Relationship to image auto-correlation. Characterization and Harris corner detector.
10	**Color images** Representations of color in digital images. Color metrics. Pixel-wise (point) operations. Color invariants and Finlayson color constancy algorithm.
11	**TeTemplate matching and advanced topics** Similarity and dissimilarity matching metrics. L2 metric and relationship to cross-correlation2D object detection, recognition, location. Sub-pixel accuracy and performance evaluation.
12	Final Exam

Term Paper:

Term paper requires students to write a report for "DIGITAL IMAGE PROCESSING TECHNIQUES". Digital Image Processing (DIP) is the process of digital images using various computer algorithms. This digital image processing has been employed in number of areas such as pattern recognition, remote sensing, image-sharpening, color and video processing and medical. This paper should present a brief overview and literature review of digital image processing techniques such as image pre-processing, image compression, edge detection and segmentation. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

Classroom Policies:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

Attendance, Absence, Lateness, Incomplete:

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Course Outcome:

At the end of this course the successful student will be able to:

- Explain how digital images are represented and manipulated in a computer, including reading and writing from storage, and displaying.
- Write a program which implements fundamental image processing algorithms.
- Be conversant with the mathematical description of image processing techniques and know how to go from the equations to code.

Moodle Forum:

We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a "0" on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

Special Needs and Accommodations:

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The Learning Environment:

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- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
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As an RNU student, you are required to use the RNU online library, as one source, to assist you in completing a required research paper or project.

Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 433
Course Title:	Information Retrieval
Credit Hours:	3
Prerequisite:	CSC 122
Term:	SP 2019
Class Time:	W 9:00 – 12:45
Class Room:	1
Instructor:	[redacted]
Office Hours:	M TU 11:00 AM – 1:00 P. M.
Telephone:	
E-Mail:	[redacted]

Course Description

Information retrieval is the identification of textual components, be them web pages, blogs, microblogs, documents, medical transcriptions, mobile data, or other big data elements, relevant to the needs of the user. Relevancy is determined either as a global absolute or within a given context or view point. Practical, but yet theoretically grounded, foundational and advanced algorithms needed to identify such relevant components are taught.

Teaching Procedures

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:

Relevance (information retrieval) Third Edition, by Gerardus Blokdyk, ISBN-13: 9780655502586

Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Homework Assignments …….. 20%
Midterm …… 40%
Final …….. 40%

No makeup exams!!!

The course grades are assigned as:

90 – 100% = A-
80 – 89% = B
70 – 79% = C
60 – 69% = D
Below 60% = F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of "A" (or "F".) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Course Schedule:

Week	Topics	Reading	Assignments
1	Introduction to information retrieval How much information - Consumers 2009 Amount of information		
2	Concept of a Doucment (all) Greengrass: 2.1.1-2.14, 2.1.6 Specialty search engines (all) van Rijsbergen: Ch 7, (up to Swets model) Retrieval evaluation (graduate students required) Manning, Raghavan, Schutze: Ch 8	Chapters 3, 4, 5, 9	Assignment 2 (assignment 1 due)
3	Initialization and clean-up, I/O, Arrays, ArrayList, Composition,	Chapter 7, 8, 9, 10	Assignment 3 (assignment 2 due)

	Implementation hiding		
4	Inheritance & Polymorphism Upcasting & Downcasting Interfaces, Abstract Classes & Polymorphism	Chapter 11, 13	
5	Database manipulation in PHP	Chapter 12 and 13	Assignment 4 (assignment 3 due)
6	Midterm Exam		
7	Review, GITHUB workshop Some Java I/0	Chapter 12, 17	(Assignment 4 due)
8	JAVA I/O and Exceptions, JDBC	Chapter 32	Assignment 5
9	GUI development, JavaFX, Inner Classes and Lambda Expressions	Chapter 14, 15, 16	(Assignment 5 due)
10	The Collections Framework, Data Structures & Algorithms The Collections Framework, Data structures & Algorithms	Chapter 20, 21 Chapter 22, 24	Assignment 6
11	Concurrency & Multithreading Design Patterns, Localization	Chapters 30, 36	
12	Final Exam		Assignment 7 (Assignment 6 due)

Term Paper:

Term paper requires students to write a report "ON INFORMATION RETRIEVAL SYSTEM". Information retrieval is the process of obtaining and presenting more related information from the largest collection of information resources according to the user's need. The tremendous growth in information resources on the Internet makes the information retrieval process a tedious and difficult task for users. Due to information overloading, there is a need for better techniques to retrieve most relevant information from web. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

Classroom Policies:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

Attendance, Absence, Lateness, Incomplete:

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Course Outcome:

Upon completion of the course, the student will be able to:

- Understand the principles of information storage and retrieval systems and database
- Understand how effective information search and retrieval is interrelated with the organization and description information to be retrieved
- Use a set of tools and procedures for organizing information
- Become familiar with the techniques involved in conducting effective searches of print and online information resources
- Use different theoretical foundations, methods and measurements to underly and evaluate major types of information retrieval systems and search engine.

. Moodle Forum:

We will use the Moodle Forum to extend the class discussion. I will actively participate in all ongoing discussion threads. This is a good place to engage your classmates in discussions of course topics. To encourage all to participate, contributions to the bulletin boards will be counted towards your class participation points. Other aspects of "class participation" will be discussed on the first day of class.

Academic Honesty:

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- During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.
- All members of the class arrive on time and leave the class only on breaks or in case of emergency.
- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
- Consideration is always given to other classes that are taking place in adjoining classrooms.
- At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

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Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 499
Course Title:	Computer Science Project
Credit Hours:	3
Prerequisite:	At least 8 CSC courses completed.
Term:	SP 2019
Class Time:	Monday 14:00 – 17:45
Class Room:	2
Instructor:	[redacted]
Office Hours:	F 9:00 – 12:00
Telephone:	
E-Mail:	[redacted]

Course Description: This is a special course for selected students to carry out research under the guidance of a faculty member. This course requires the student to prepare a proposal, which must be approved by the Department Chair.

Course Information:
The senior capstone course in which student individually design a software system, document and present their conclusions. Students also develop a detailed undergraduate portfolio for a comprehensive review of their undergraduate work. Project work involves the development of design alternatives, development of an appropriate software architecture, and design and test the implemented system. The software design focuses on addressing overall design goals while understanding constraints of cost, etc. Deliverables and schedule are determined by the instructor.

Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

Text:

Reading materials provided by the instructor.

Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Contribution to Class ….... 20%
Final Presentation …… 30%
Final Project…….. 50%

No makeup exams!!!

The course grades are assigned as:

91 – 100%	-- A
81 – 90%	-- B
71 – 80%	-- C
61 – 70%	-- D
Below 61%	-- F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of "A" (or "F".) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Final Project:

The first document you shall hand in in the course is a project description. It shall contain:

- Background. A brief description of the subject area of your degree project. If you, for example, do a project about software architectures, you describe what a software architecture is and why it is important to select the right architecture for the job.
- Problem formulation. Describe the actual problem you plan to investigate. You can read about how to find a suitable problem here.
- Expected result. Describe what results you expect from your project.

The purpose of the project description is for the examiner to determine if your project idea is reasonable within the limited time frame of a thesis project.

All projects must be supervised by an authorized Computer Science faculty member. Although students may work with advisors outside of the field of Computer Science, they must have a Computer Science advisor. Project proposals must be approved by the Computer Science advisor in advance to ensure their suitability.

All projects must include a final written report.
All grades associated with the Project must be B or higher.
What are the different categories of projects?

- joining a faculty member's research group
- further developing a project started within an advanced course, perhaps in collaboration with other students from that course

- working more one-on-one with a faculty member - this might either be a smaller project or a test-run for a larger initiative
- working as a member of one of the University's large team efforts - there are an increasing number of these relatively high-profile projects
- providing critical computer science skills to disparate projects across the University
- working on commercial, industrial or government projects - with appropriate coordination of NDAs
- working with other CS students on exercises which may develop into 'start-ups'

Course Schedule:

Week	Topic
1	Introduction to Capstone Project
2	Project Idea Identification/ Selection
3	Project Adviser Selections
4	Roadmap Generation
5	Relevant Work review and reuse
6	Code of ethics in intellectual Property use
7	PROPOSAL
8	Project Development methodology How to present the potential Project Idea
9	Proposal Preparation and Presentation Introduction to Presentation Skills
10	Project Presentation –Final Report Generation
11	Introduction to Capstone
12	PRESENTATION

Classroom Policies:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments, homework and examinations. You can get policies regarding to the University academic policies from the Student Handbook on the University web-site or in the University catalog.

Attendance, Absence, Lateness, Incomplete:

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Course Outcome:

Students who pass this class have the working knowledge for software development and hands-on experience in working on real life projects. At the end of the course student will possess the skills necessary to:

1. Work on either an ill defined or well defined problem
2. Enforce the necessary steps towards the completion of the project
3. Use the knowledge available and search when necessary and apply it effectively
4. Disseminate the technical information in a professional manner when necessary

Moodle Forum:

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Special Needs and Accommodations:

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Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 511
Course Title:	Computer Architecture
Credit Hours:	3
Prerequisite:	Permission from Instructor
Term:	WI 2019
Class Time:	Monday 9:00 – 12:45
Class Room:	2
Instructor:	[redacted]
Office Hours:	SA, SU 1:00 – 2:30 P. M.
Telephone:	
E-mail:	[redacted]

Revised 2019.10

2. Catalog Description:

This course provides an understanding of modern computing technology through an in-depth study of the interface between hardware and software. It demonstrates the computer architecture from the application programs down to the hardware levels. Topics covered are applications of digital logic circuits, register transfer logic and assembly language to the design and operation reviewed.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text:

Computer Architecture by William Stallings, latest ed., ISBN-13: 9780134997193 published by MacMillan.

5. Course Requirements:

Due to the abundant amount of material that has to be covered in this class, in addition to the regular class periods, extra class might be necessary.

Examinations

There are two in-class exams and they are scheduled as:

Midterm: 6th class

Final: last class

6. Course Requirements:

There will be a in-class quiz in each class and the quiz material will be announced at the end of each class. Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Quiz 10%
Midterm 35%
Final 35%
Term Project 20%

No makeup exams!!!

The course grades are assigned as:

90 – 100% = A
80 – 89% = B
70 – 79% = C
Below 70% = F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

7. Term Project:

This course is a hands-on research oriented course. You (in groups of two or three) are expected to propose, conduct, and experimentally evaluate a 2-3-month long research project whose goal is to advance the state-of-the-art and/or current understanding in computer architecture or a related subject. The topic of the project is flexible, but it must be approved by me. This is your

chance to explore in depth a computer architecture topic that interests you and perhaps even publish your innovation in a top computer architecture conference. I strongly encourage you to start thinking about your project topic as early as possible and interacting with me to crystallize it over time.

8. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

9. Attendance, Absence, Lateness, Incomplete:

In accordance with the policies of the Reagan National University, class attendance is required, and classes will start promptly at the schedule time. If you are absent or excessively late, you will receive a score of zero for the participation of that class.

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Warning: Any cheating and plagiarism will result in a failing grade in the course.

10. Course Outline:

Week	Topics	Reading Assignments
1	MIPS Assembly language. , • The Von Neumann machine • Instructions • registers, • arithmetic, add , addi translating high level arithmetic into assembly.	Ch. 1
2	More on Mips Assembly • Memory and Registers, lw and sw. Addressing modes. • Arrays. Some example programs with arrays. Subroutines • Stacks and the answer to recursive subroutines	Ch. 2, 3
3	Revision of Digital logic. (a) logic gates, truth tables, implementing truth tables. (b) Longest path.	Ch. 4
4	Arithmetic (a) Binary numbers, hex-numbers.	Ch. 5

	(b) The concept of representation. (c) Negative Numbers and Two's complement (d) The evils of floating point. i. All that you needed to know about floating point. ii. Floating point addition is not associative	
5	Implementing Addition, Ripple adder, Faster Adder. Reading Tanenbaum 3.2.3. Handout on the ripple carry adder.	Ch. 6, 7
6	Midterm Exam	
7	Implementing the MIPS processor • Latches and memory Reading Tanenbaum 3.3. • The single cycle approach. Nothing much in Tanenbaum. Look at the slides. The basic idea, use the opcode of the instruction to specify what functional units have to be switched on. Do everything in a single cycle. • Problems with the single cycle approach. Slowest instruction gives the cycle time, a functional unit can only be used for one thing at a time so have to repeat functional units, separate adders.	Ch. 8
8	Multicycle implementations • The concept of a cycle. • Finite state machines. • Balancing the work into single cycles. • Controlling the work done with a finite state machine. • The five cycles of the MIPS.	Ch. 9, 10
9	Implementing Finite State machines • Roms, PLAs • Microcode • RISC/CISC • Microcode and some modern processors.	Ch. 11
10	Pipelines • Doing more than one thing at once. • Problems with pipelines, stalls, branch delay slots. • Making programs faster by avoiding stalls.	Ch. 12
11	Caches. • Principle of locality • Direct Mapped Caches • Set Associative Caches • LRU • write through, write back • Cache line, length	Ch. 13
12	Final Exam	

11. Course Outcome:

By the end of the course, the student should understand the major architectural styles and appreciate the compromises that they encapsulate. They should be able to read outline descriptions of real processors and understand in which way their designs fit into the frameworks described in the course. They should also be able to understand the impact of design choices in programming in the context of a specific architecture.

12. Academic Honesty:

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Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 512
Course Title:	Operating Systems
Credit Hours:	3
Prerequisite:	CSC 511
Term:	WI 2019
Class Time:	TU 9:00 – 12:45
Class Room:	1
Instructor:	[redacted]
Telephone:	
E-Mail:	[redacted]

Revised 2019.10

2. Catalog Description:

This course introduces the facilities provided in modern operating systems. It examines the issues in operating system design and implementation such as inter-process communication, process scheduling, deadlock, memory management, virtual memory, file systems and distributed systems. Particular emphasis will be given to the major OS subsystems.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text:

William Stallings, *Operating Systems - Internals and Design Principles*, latest edition,
ISBN-13: 978-0134670959, Prentice-Hall.

5. Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Two Midterm …… 25% each
Final ……... 30%
Term project..……....….. 20%

No makeup exams!!!

The course grades are assigned as:

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C
Below 70%	=	F

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Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

6. Term Project:

Term paper requires students to write a report "Functions of the Operating System". **Some of the functions are given below:**

i. I/O Management:

Selecting the appropriate channel of data transfer as required, activating and handing over control, giving them autonomy for overlapped operation. The transfer of the data between primary and secondary storage is left to the control of the DMA Controller.

ii. Memory Management:

Allocating/deallocating memory to programs, creating virtual memory in disk drives, swapping programs and data from one place to another in the memory. Preventing one program to interfere with another program.

iii. File Management:

Anything and everything that is kept in permanent storage is done by means of a file which can be of any length, as far as the user is concerned. But, as far as the disk drives are concerned, the spaces are allocated to a file in clusters, as and when additional space is required, and the clusters are not necessarily in sequence one after another.

The Operating System, not only creates and allocates spaces for files, but it keeps quick accessible records of the file structure details in the directory area and in the File Allocation Table [FAT].

iv. Job Control:

In case of batch-processing jobs, the Operating System controls the loading, execution and unloading of the jobs, along with initiating activities of input/output operation.

v. Buffering:

A buffer is a specific storage area, created in primary storage or in the data-channel or both, where the data is stored in transit between input/output devices and main memory.

The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

7. Classroom Policies:

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Warning: Any cheating and plagiarism will result in a failing grade in the course.

9. Course Outline:

In this course we will cover operating system concepts and design principles with the following schedule (subject to minor changes in content and schedule):

Week 1

- Introduction to operating systems

Week 2

- Computer hardware review

- Review of basic operating system concepts

Week 3:

- Processes and threads : process and thread models, management, and implementation
- Interporcess Communication: race conditions, critical regions, mutual exclusion

Week 4:

- First Midterm
- Interprocess communication: sleep and wakeup, semaphores, mutexes, monitors, message passing, and barriers.

Week 5:

- Classical interprocess communication problems: The dining philosophers problem, readers and writers problem, the sleeping barber problem.

Week 6:

- Scheduling: batch, interactive, and real-time.

Week 7:

- Deadlock detection, recovery, and avoidance

Week 8:

- Second Midterm
- Memory management : basics, swapping, virtual memory

Week 9:

- Page replacement algorithms Design and implementation issues of paging systems, segmentation

Week 10:

- Files directories and file system implementation.

Week 11:

- Security issues: cryptography, authentication, attacks, and protection mechanisms, trusted systems
-

Week 12:

Final Exam

10. Course Outcome:

At the end of this course, you will be able to:

- Explain the objectives and functions of modern operating systems, and how they have evolved from primitive batch systems to sophisticated multi-user systems.
- Describe how computing resources are used by application software, and managed by system software. Contrast between kernel mode and user mode in an operating system.
- Compare and contrast the common algorithms used for both preemptive and non-preemptive scheduling of tasks in operating systems, such as priority, performance comparison, and fair-share schemes.
- Explain memory hierarchy and cost-performance tradeoffs. Compare and contrast paging techniques.
- Compare and contrast different approaches to file organization, recognizing the strengths and weaknesses of each.
- Identify potential threats to operating systems and the security features designed to guard against them.

11. Academic Honesty:

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Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 513
Course Title:	Data Structures
Credit Hours:	3
Prerequisite:	CSC 511
Term:	WI 2019
Class Time:	Wednesday 2:00 – 5:45
Class Room:	3
Instructor:	[redacted]
Office Hours:	SA – 1:00 – 2:30 P. M.
Telephone:	
E-Mail:	[redacted]

2. Catalog Description:

This course covers data structures and associated algorithms that allow complex tasks to be solved in simple and elegant ways. It focuses on program design and organization ideas such as abstract data types, data structures and object-oriented programming. Topics include are: lists, stacks, queues, heaps, dictionaries, maps, hashing, trees and balanced trees, sets, and graphs.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text:

Data Structures and Algorithms in Java, 6th edition, Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, Sixth Edition, ISBN-13: 978-1-118-77133-4

5. Course Requirements:

Due to the abundant amount of material that has to be covered in this class, in addition to the regular class periods, extra class might be necessary.

Examinations

There are two in-class exams and they are scheduled as:

Midterm:	6th class
Final:	last class

6. Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Midterm …… 30%
Term Project……....….40%
Final …….. 30%

No makeup exams!!!

The course grades are assigned as:

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C
Below 70%	=	F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills

acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

7. Term Project:

Term project requires students to write a report "A STUDY ON THE USAGE OF DATA STRUCTURES IN INFORMATION RETRIEVAL". This paper throws light in the usage of data structures in the field of information retrieval. Information retrieval is an area of study which is gaining momentum as the need and urge for sharing and exploring information is growing day by day. Data structures have been the area of research for a long period in the arena of computer science. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

8. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

9. Attendance, Absence, Lateness, Incomplete:

In accordance with the policies of Reagan National University, class attendance is required, and classes will start promptly at the schedule time. If you are absent or excessively late, you will receive a score of zero for the participation of that class.

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Warning: Any cheating and plagiarism will result in a failing grade in the course.

10. Course Outline:

Week	Topics	Reading Assignments
1	Introduction. Course overview. Introduction to algorithms	Ch. 1
2	Analyzing and Designing algorithms, Recursion	Ch. 2, 3

	Complexity analysis	
3	Recurrence equations, Data Structure	Ch. 4
4	Stacks and queues	Ch. 5
5	Heapsort, Hashing	Ch. 6, 7
6	Midterm Exam	
7	Trees and Priority Queues Binary Search Trees	Ch. 8, 9
8	Balanced BSTs (including Red-Black Trees)	Ch. 10
9	Graphs	Ch. 11, 12
10	Elementary Graph Algorithm	Ch. 13
11	Elementary Graph Algorithm	Ch. 13
12	Final Exam	

11. Course Outcome:

After completing this course satisfactorily, a student will be able to:

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.
- Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.
- Demonstrate different methods for traversing trees.
- Compare alternative implementations of data structures with respect to performance.

Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

12. Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

13. The Learning Environment:

Reagan National University is committed to providing a positive learning environment in which students of all ages and backgrounds can learn together in a setting that encourages the free exchange of ideas and information. To accomplish this goal, the members of the RNU Board have established the following expectations for learning.

- All backgrounds and cultures are respected.
- During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.
- All members of the class arrive on time and leave the class only on breaks or in case of emergency.
- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
- Consideration is always given to other classes that are taking place in adjoining classrooms.
- At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

Reagan National University Library Services:

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24 hours 7 days a week. All students can connect to the online library through the computers and laptops available at home and on campus. Each student must use their own pass code to access the library.

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Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 514
Course Title:	Database Theory
Credit Hours:	3
Prerequisite:	Permission from Instructor
Term:	WI 2019
Class Time:	Thursday 2:00 – 5:45
Class Room:	1
Instructor:	[redacted]
Office Hours:	SA 11:00 – 1:00
Telephone:	
E-Mail:	[redacted]

2. Catalog Description:

This course provides the understanding of the fundamentals of relational systems including data models, database architectures, and database manipulations. The main subjects of the course include the understanding of relational database theories, industry standard SQL, and database design. A conceptual/semantic data modeling with the entity-relationship diagramming technique is also covered.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text:

An Introduction to Database Systems by C. J. Date, 8th ed., ISBN-13: 978-0321197849 Published by Addison-Wesley.

5. Course Requirements:

Due to the abundant amount of material that has to be covered in this class, in addition to the regular class periods, extra class might be necessary.

Examinations

There are two in-class exams and they are scheduled as:

Midterm: 6th week

Final: last class

6. Course Requirements:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Midterm 40%
Final 40%
Term Project..... 20%

No makeup exams!!!

The course grades are assigned as:

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C
Below 70%	=	F

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Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

7. Term Project:

Term paper requires students to write a report on "Primary Key in Relational Database". This paper shall discuss the main feature of a relation database would be the primary key. It is a unique identifier set to each and every record that travels across different tables in relationships. The primary keys job is to make each record unique and it lets data to be kept in more than one table. Each table within a relational database will have a field for the primary key. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

8. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

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Warning: Any cheating and plagiarism will result in a failing grade in the course.

10. Course Outline:

Week	Topics	Reading Assignments
1	INTRODUCTION -- Basic database concepts, terminology, and architecture; Types of database management systems. Differences between relational, key-value, document, and graph models.	Ch. 1, 2
2	DATA MODELING -- Relations, schemas, constraints, queries, and updates; Conceptual vs. physical modeling; Entity types, attributes, keys, roles; Weak types, ER diagrams; ER vs, UML; EER techniques: subclasses and inheritance, union types; Document and Key-Value stores; Graph stores; Knowledge representation and ontologies.	Ch. 3, 4
3	SQL -- Data definition: specifying tables, data types, constraints; Simple SELECT, INSERT, UPDATE, DELETE statements; Complex SELECT queries, including joins and nested queries; Actions and triggers; Views; Altering schemas.	Ch. 5, 6, 7
4	NON-RELATIONAL QUERY LANGUAGES -- Advanced queries for Redis, Mongo, and Neo. RELATIONAL ALGEBRA -- Definition of algebra; Relations as sets; Operations: select, project, join, etc.	Ch. 8
5	DATABASE PROGRAMMING -- Embedded SQL; dynamic SQL, JDBC; Avoiding injection attacks; Stored procedures; Lightweight data access layers for Python and JavaScript applications; PHP and MySQL (well, maybe we'll get to this...); Object Relational Modeling: Hibernate for Java, ActiveRecord for Rails.	Ch. 10, 11
6	Misterm Exam	
7	NORMALIZATION THEORY -- Functional dependencies, 2NF, 3NF, BCNF, 4NF, 5NF; Minimal covers; Relational decompositions.	Ch. 14, 15
8	INDEXING -- Files, blocks, and records; Heap files vs. sorted files; Hashing; RAID; Replication; Single-level and multi-level indexes; B-Trees and B+-trees; Multiple key indexes; Hash, bitmap, and functional indexes.	Ch. 16, 17
9	QUERY PROCESSING AND OPTIMIZATION --	Ch. 18, 19

	Translation of SQL into query plans; fundamental algorithms for external sorting, projection, selection, and joins; Pipelining; Heuristics for optimization.	
10	TRANSACTIONS, CONCURRENCY, AND RECOVERY -- Transaction basics; Concurrency basics; Recovery basics; Sharding in Mongo.	Ch. 20, 21, 22
11	SECURITY -- Overview of security issues; GRANT and REVOKE; Roles; Public-key cryptography; Statistical security; Flow control.	Ch. 30
12	Final Exam	

11. Course Outcome:

After successful completion of the course, students are expected to be able to do the following.

- Model databases proficiently at conceptual and logical levels of design. Use the entity-relationship model (E-R) and E-R diagrams with extensions.
- Develop relational database schemas which respect and enforce data integrity represented in E-R diagrams.
- Implement a relational database schema using Structured Query Language (SQL), to create and manipulate tables, indexes, and views.
- Create and use complex queries in SQL.
- Write database application programs with an understanding of transaction management, concurrency control, and crash recovery.

12. Academic Honesty:

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Board have established the following expectations for learning.

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- Consideration is always given to other classes that are taking place in adjoining classrooms.
- At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

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Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 521
Course Title:	Artificial Intelligence
Credit Hours:	3
Prerequisite:	CSC 511
Term:	WI 2019
Class Time:	SA 9:00 –12:45
Class Room:	1
Instructor:	[redacted]
Office Hours:	Wed 1:00 –3:00
Telephone:	
E-Mail:	[redacted]

2. Course Description:

This course is an introduction to the basic principles, techniques, and applications of Artificial Intelligence. It focuses on the materials on AI programming, logic, search, game playing, machine learning, natural language understanding, and robotics introduce the student to AI methods, tools, and techniques, their application to computational problems.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text Book:

Artificial Intelligence, A Modern Approach (3rd edition) by Russell and Norvig and published by Prentice Hall (ISBN: 0136042597).

5. Grading Policy:

4-homeworks	@ 20%
Term paper	@ 20%
Midterm	@ 30%
Final	@ 30%

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C
Below 70%	=	F

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

6. Term paper:

Term paper requires students to write a report on "Artificial Intelligence and the future". This paper shall discuss the following questions: What is AI? Why is Machine learning a hot topic these days in the tech world? How does it affect us and to what extent we have used it till today? Do you know that many of the websites like Facebook, Instagram, and YouTube are somehow powered by AI? The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

7. Academic Integrity:

Reagan National University is committed to the principles of honesty and academic integrity in every facet of our operation. This requirement includes every person in the RNU community. Students are expected to uphold these principles in the strictest ways possible. Scholarship is fundamental to the very existence of the University and without integrity and honesty we cannot endure.

The University has established extensive processes to promote these virtues and to provide penalties for those who transgress. Students are referred to the STUDENT HANDBOOK and the UNIVERSITY CATALOG for further information and penalties.

8. Schedule and Contents:

Week 1 What Artificial Intelligence Is:

- Introduction
- Domains of Artificial Intelligence
- Characteristic features of AI systems
- Illustrative example: A planning system
  - Description of the world model of the system
  - The state-space search paradigm
  - A general problem solving method: Means-Ends Analysis
  - Illustration of the MEA method
  - The goal tree
  - Explanations provided by the system
- Another example: proving theorems in prepositional calculus with MEA
  - Conclusion
  - Exercises

Week 2 & 3 Programming in COMMON LISP

- Primary data structures
  - Atoms
  - Lists
- Program structure and evaluation
  - Program structure
    - The LISP interpreter
      - Examples of evaluations
- Special functions
  - Setq
  - Quote
- Some primitive functions
  - Car and cdr
  - Cons
  - List and append
- LISP predicates
  - Atom
  - Listp

- Endp
- Null
- Eq, eql, equal
- Number
- Member

Logical operators
- Not, and, or

Conditionals
- Cond

Printing and reading
- Print
- Read

User-defined functions
- Defun
- Optional arguments

Exercises

Iteration
- Let and let*
- Do list

Mapping functions
- Mapcar

Recursion
- Recursive functions
- A recursive trace

Property lists
- Get
- Setf
- Symbol-plist

Other functions
- Function
- Remove, remove-if, remove-if-not
- Gensym

Lambda expressions

Scope of variables

Application: Pattern matching

Exercises

Week 3 & 4 Search Techniques

- Searching the state-space of a problem
- Another search problem
- Blind search
  - Bread-first search
  - Depth-first search
  - Uniform-cost search
- Heuristic search
  - Hill climbing
  - Best-first search
  - The search algorithm A*
- Implementation of the search methods
- Game tree search
  - An exemplary game: Tic-tac-toe
  - The minimax procedure
  - Searching a partial game tree
  - Alpha-beta pruning
    - An alpha cutoff
    - A beta cutoff
  - Exercises

Week 5 & 6 Knowledge Representation and Problem Solving

- Introductions
  - What is a representation?
  - General features of a representation
- Logic
  - The standard form of logic
    - Representing knowledge in first-order logic
    - An axiomatic system
    - Natural deduction
  - The clausal form of logic
    - Definition
    - Conversation to clausal form
  - Resolution
    - The resolution rule of inference
    - The resolution method
    - Resolution in prepositional logic

- Resolution in predicate calculus
  - Substitution and unification
  - A unification algorithm
  - Resolution of predicate calculus expressions
  - Strategies for improving the efficiency of resolution
- General features of the logic representation
  - Exercise
- Logic programming and Prolog
  - A Prolog program
  - How Prolog answers questions
  - The relation between Prolog and logic
  - Declarative and procedural meaning of Prolog programs
  - Data objects
    - Variables
    - Structures
    - Lists
  - Some operation on lists
    - Membership
    - Concatenation
    - Add
    - Delete
    - Sub list
  - Arithmetic
  - Input and Output
  - Controlling backtracking
    - Negations
    - Fail and true
    - Order of clauses and goals
    - Depth-first search in Prolog
    - Exercises
  - Production systems
    - The architecture of a production system
    - An abstract example of a production system
    - Playing tic-tac-toe with productions
    - A production system for the water jug problem
    - An example of production system with inference rules
    - General features of the production systems
    - Exercises

- Semantic networks
  - Representing knowledge in semantic networks
    - Semantic networks with binary relations
    - Representing non-binary predicates
    - Implementing a semantic network in LISP
  - Reasoning with semantic networks
    - The treatment of the relationships Isa and instance-of
    - The transitivity of Isa and Instance-of
    - Implementing the transitivity of Isa and LISP
  - Intersection search
  - Network matching
- General features of the semantic networks
  - Exercises
- Frames
  - Representing knowledge in frames
  - Reasoning with frames
    - Instantiation (or filling in slots)
    - The "criteriality" inference
    - Triggers (event or data-driven processing)
    - Matching
  - Implementing frames
  - General features of the frames
  - Exercises
- Exercises

Exam 1

Week 7 & 8 Machine Learning

- Introduction
  - What is learning?
  - Concepts
  - Intuitive definition of generalization
  - Intuitive presentation of some basic learning strategies
    - Rote learning
    - Explanation-based learning
    - Empirical inductive learning from examples
    - Conceptual clustering

- Quantitative discovery
- Learning by abduction
- Learning by analogy
- Case-based reasoning
- Artificial neural networks
- Genetic algorithms
- Multi-strategy learning

Explanation-based learning

- The explanation-based learning problem
- The explanation-based learning method
- Learning an operational definition of a concept
  - The learning problem
  - The learning method
- Features of the explanation-based learning method

Empirical inductive learning

- Generalization rules
- Generalization of a set of descriptions
- Empirical inductive learning from examples
- The version space method
- General presentation of the method
- The learning algorithm
- A complex example: learning the concept of an ill cell
- Features of the version space method

Learning by analogy

- General presentation
- A simple form of analogy: determinations
- Definition of determinations
- Use of the determinations
- Problem solving by analogy
- Exercises

Week 9 & 10 Natural Language Processing

- Introduction
- Goals of natural language processing
- Types of applications
- What is natural language understanding?

Why is natural language processing difficult?

- Ambiguity
- Paraphrase
- Ellipsis
- Reference
- Awareness

Components of natural language processing

Morphological analysis

Syntactic analysis

- Grammars
- Context-free grammars
- Parsing
- Transition networks as language recognizers
- Augmented transition networks

Compositional semantics

Semantic grammars

Exercises

Week 11 & 12 Expert and Knowledge Acquisition

- General presentation
  - What are the expert systems?
  - Expertise domains
  - Expert system shells
  - Knowledge acquisition
- Modes of knowledge acquisition
  - Expert to knowledge base via a knowledge engineer
  - Expert to knowledge base via an intelligent editor
  - Expert to knowledge base via a learning system
    - Book knowledge-to-knowledge base via a text understanding system and learning system

Case Study: Disciple, an expert, and knowledge acquisition system

- An intuitive view of Disciple
- Knowledge Base
- Disciple as an Expert System
  - The problem solving method
  - General presentation
  - Problem reduction
  - Problem solving through decomposition

Problem solving through by constraints
Problem solving through by analogy
Control mechanisms
Definition of the search space
Global control of the search
Meta-rules
Knowledge acquisition in Disciple
The knowledge acquisition problem
General presentation of the knowledge acquisition method
Illustration of the knowledge acquisition method
Explanation-based mode
Analogy-based mode
Developing the knowledge base
Features of the knowledge acquisition method
Exercises

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9. Classroom Policies:

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Warning: Any cheating and plagiarism will result in a failing grade in the course.

11. Course Learning Outcome:

On successful completion of the course the student will be able to:
Knowledge and understanding:

- Explain basic concepts of machine learning and classical AI

- Compare advantages and disadvantages of some basic AI algorithms
- Account for the historical development, current situation and future prospects for some sub-area of AI.

Skills and abilities:

- Choose appropriate algorithms for solving given AI problems in a memory- and time-efficient manner.
- Implement efficient AI algorithms in a suitable programming language.
- Summarize scientific progress and ethical issues.

Judgment and approach:

- Analyze and critically discuss soft aspects of AI.
- Summarize and constructively criticize scientific texts.

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- Each student turns in work that is his or her own.
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Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 537
Course Title:	Data Communications
Credit Hours:	3
Prerequisite:	CSC 511
Term:	WI 2019
Class Time:	Friday 2:00 – 5:45
Class Room:	1
Instructor:	[redacted]
Office Hours:	Wed 3:00 – 5:00
Telephone:	
E-Mail:	[redacted]

2. Catalog Description:

This course provides the foundation for work in data communications and local area network management. It focuses on the primary aspects of data communications networking, including a study of the Open Systems Interconnection (OSI) and Internet models. Topics include in this course are: data transmission principles, media, major protocols, topologies, routing methods, introduction to networking principles, and Network operating system management fundamentals.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text:

Stallings, W., "Data and Computer Communications", 10th ed. Macmillan,
ISBN-13: 978-0133506488.

5. Course Requirements:

Due to the abundant amount of material that has to be covered in this class, in addition to the regular class periods, extra class might be necessary.

Examinations

There are two in-class exams and they are scheduled as:

Midterm: 6th class

Final: last class

6. Grading:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

35% Midterm Examination

35% Final Examination

20% Term Paper

10% Quizzes. Quizzes (which need not be announced before hand) based on the material discussed so far in the course.

No makeup exams!!!

The course grades are assigned as:

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C
Below 70%	=	F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

7. Term Paper:

Term paper requires students to write a report on "Measurement-based simulation of WiFi interference". This paper shall cover a typical wireless network exhibits time-varying channel conditions and complex interference relationships, which are also influenced by different vendor implementations. Therefore, to improve the mapping between wireless simulation and real life, site and device specific models are needed. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

8. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

9. Attendance, Absence, Lateness, Incomplete:

In accordance with the policies of Reagan National University, class attendance is required, and classes will start promptly at the schedule time. If you are absent or excessively late, you will receive a score of zero for the participation of that class.

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Warning: Any cheating and plagiarism will result in a failing grade in the course.

10. Course Outline:

Week	Topics	Reading Assignments
1	Overview of computer networks, the Internet, the OSI model and TCP/IP stack.	Ch. 1, 2
2	Ethernet, Token Ring, and Wireless and the methods they use of connecting to the physical layer. Data Link Layer responsibilities.	Ch. 3, 4, 5
3	Internet protocols on the Network layer and subnetting LANS.	Ch. 6
4	Router hardware and configuration. Routers, routed and routing protocols.	Ch. 7
5	TCP/IP segment, IP packet and Data Link frame formats.	Ch. 8, 9
6	Midterm Exam	
7	Network timing and Congestion Control.	Ch. 10, 13
8	Peer-to-peer and client-server programming using sockets in TCP or UDP.	Ch. 11, 12
9	Reliability, Connection-Oriented and Connectionless protocols on the Transport Layer, namely TCP and UDP.	Ch. 14
10	Applications used in every-day network-related tasks.	Ch. 15, 16
11	Wireless and Mobile networks.	Ch. 17
12	Final Exam	

11. Course Learning Outcome:

On successful completion of this course, the student should be able to

1. Describe the fundamental principles in data communications and computer networks including
- Delay and loss in Packet-Switched Networks
- Protocol layers and their service models
- Popular network applications like HTTP, FTP, SMTP, DNS, P2P, etc.
- Reliable data transfer and sliding window protocols
- Congestion control and flow control
- Routing algorithms like LS an DV
- LAN and Ethernet with emphasis on error detection and multiple access protocols

2. Mathematically and logically analyze how computer protocols work in the abstract

3. Solve real-world problems in the context of today's Internet (TCP/IP and UDP/IP)

12. Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

13. Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

14. The Learning Environment:

Reagan National University is committed to providing a positive learning environment in which students of all ages and backgrounds can learn together in a setting that encourages the free exchange of ideas and information. To accomplish this goal, the members of the RNU Board have established the following expectations for learning.

- All backgrounds and cultures are respected.
- During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.
- All members of the class arrive on time and leave the class only on breaks or in case of emergency.

- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
- Consideration is always given to other classes that are taking place in adjoining classrooms.
- At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

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Reagan National University

Syllabus

1. **Administrative Information:**

Course Number:	CSC 540
Course Title:	Programming Languages Principles
Credit Hours:	3
Prerequisite:	Permission from Instructor
Term:	SP 2019
Class Time:	TU 14:00-17:45
Room:	3
Instructor:	[redacted]
Office hour:	F 9:00 – 12:00
Telephone:	
E-Mail:	[redacted]

2. **Course Description:**

This course presents the principles of programming language design, and programming in multiple paradigms, including functional programming, logic programming and object-oriented programming. It focuses on programming language specification and semantics such as language models, functional, object-oriented, logic, string, and concurrent programming.

3. **Teaching Procedures:**

Teaching procedures for this course will include, professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. **Text:**

Concepts of Programming Languages, 12th edition, by Robert W. Sebesta, ISBN: 978-0134997186

Course Requirements:

Students will be expected to complete independent projects during the semester. Because this is programming languages course, students must know how to write professional programs in at least two different languages.

5. **Research Requirement**

As a graduate student at Reagan National University, each student in this class must do some sort of research regarding the programming language principles from computer science aspect. You could use the online library that is available from RNU web site. Of course, you may also go to any public libraries to do your research. Your research must be a topic related to this course.

6. **Grading Policy:**

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the homework and final project as well as one middle examinations. The weights of the exams are:

Midterm ……..…….. 30%

Final Exam ……..…….. 40%

Term Paper and Homework …… 30%

The course grades are assigned as:

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C
Below 70%	=	F

Note: Any cheating on the test or project will result in a grade of "F". Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams. By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

Term paper proposal format:

You are required to submit a typed proposal, consisting of (1) the title of the topic, (2) your names and email addresses, (3) a brief description (one or two paragraphs) of the topic, and (4) five main references to recent books or articles you plan to use. Web links can be used as references, however at least three references should be a book or a technical article. The proposal can be in bullet or paragraph format. The length of the proposal should be one page, double spaced.

Term paper format:

Length: Among 15 to 20 pages. Your report should be typed on 8.5 x 11 inches white paper, double-spaced.

Contents: At least (not limited) to the following: (You may select your own style of writing as long as it composes a complete technical paper.)

1.. An excellent title

2. Abstract

3.. Introduction and/or Motivation: In learning the algorithm, you are really learning two

things: the problem that the algorithm is designed to solve; and the particular solution provided by the algorithm. Your paper should discuss both of these things.

4. Algorithm Description: You should present the studied algorithm(s) for the problem or discuss some algorithm design technique not covered in class, giving examples of algorithms employing this technique.
5. Algorithm Analysis: You should discuss the complexity of the algorithm to the extent that you are able, and also explain the running time function if you can.

6. Discussions: Improvement, comments, or suggestions to the algorithm(s) you have described.

7. Conclusion

8. References: List all the related references using the department's standard bibliographic and reference style. Also attach a copy of your main reference(s) that is/are the source of your algorithm and/or algorithm analysis.

Term paper evaluation criteria:

1. (10%) Title and Abstract: Was the title appropriate? Was the abstract a good summary of the paper?

2. (30%) Readability and Organization: Were there any grammar and/or spelling errors? Were complete sentences used? Were the sentences concise and clear? Were the paragraphs, sections, and the whole paper well organized? Did you present the information so that your reader could understand without going to the original source?

3. (35%) Technical quality: Was it clear to me that you understood the paper you were summarizing? Was your coverage of the paper reasonably complete? Were the techniques you used to design and analyze the algorithm appropriate, efficient?

4. (15%) Adequate references: Was the specified form followed? Did you refer to the bibliography as appropriate throughout your text?

5. (10%) Adequate length: Was there any sections that could be shortened or extended?

Extra credit (up to 5%) will be given to the originality and significance.

Term paper presentation:

Length of the presentation is 42 minutes (for each student: 14 minutes), followed by 3 minutes discussion session where the participants will ask questions and discuss the topic. Presentations use MS-PowerPoint.

Each presentation will be evaluated by all participants and evaluations forms will be provided.

Course Schedule

Week	Lecture Topics
1	Introduction to Programming Languages
2	Python, SML, Prolog
3	Programming language syntax
4	Names, Scopes, and Bindings
5	Semantic Analysis
6	Midterm Exam
7	Control Flow
8	Data Types, Subroutines and Control Abstraction
9	Data Abstraction and Object Orientation
10	Functional Languages, Logic Languages
11	Concurrency; Review Session
12	Final Exam

7. **Classroom Policies:**

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

Attendance, Absence, Lateness, Incomplete:

In accordance with the policies of Reagan National University, class attendance is required, and classes will start promptly as scheduled. If you are absent or excessively late, you will receive a score of zero for the participation of that class.

A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has completed at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

8. **Course learning Outcomes:**

At the end of this course, students should be able to:

1. Understand the central issues and principles governing the design of modern programming languages.
2. Understand the fundamental differences between the four major programming language paradigms.
3. Understand the value of operational and denotational semantic specifications of programming languages.
4. Implement a syntax analyzer for any programming language.
5. Understand the process of translation of a program in a high-level language to a low-level language.

9. **Academic Honesty:**

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

10. **Special Needs and Accommodations**:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

11. **The Learning Environment**:

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- All members of the class arrive on time and leave the class only on breaks or in case of emergency.
- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
- Consideration is always given to other classes that are taking place in adjoining classrooms.
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completing a required research paper or project.

Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 543
Course Title:	Software Engineering
Credit Hours:	3
Prerequisite:	CSC 540
Term:	WI 2019
Class Time:	TH 14:00 -- 17:45
Class Room:	1
Instructor:	[redacted]
Office Hours:	M 9:00 – 12:00
Telephone:	
E-Mail:	[redacted]

2. Catalog Description:

This course covers the software engineering methods and tools used for systematic development of software products. It focuses on the software development process, from requirements initiation and analysis, through specification and design, to implementation, integration, testing, and maintenance. It also provides a solid introduction to design patterns: their usage, benefits and implementations.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text:

Software Engineering: A Practioner's Approach, 8th ed. By Roger S. Pressman.
ISBN: 978-0078022-12-8. 2014.

5. Assignments:

There will be three project assignments. The projects will involve analyzing real world problems, design software with CASE tools (Excelerator), and implement the software with GUI and DATABASE tools. All assignments are group projects.

All assignments are due at the class on the due day. Later homework will have 20% subtracted from the score for every late day.

6. Course Requirements:

Due to the abundant amount of material that has to be covered in this class, in addition to the

regular class periods, extra class might be necessary.

Examinations

There are two in-class exams and they are scheduled as:

Midterm: 6th class

Final: last class

7. Grading:

Letter grades will be assigned to each student based on a mathematical calculation of the points earned on the examinations. The weights of the exams are:

Final Project……... 25%

Midterm …… 30%

Final ……..……..45%

The course grades are assigned as:

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C
Below 70%	=	F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

8. Final Project:

A. Organization of the project teams

All students must participate in one project team (a list of suggested term projects are listed below). Each team (2 to 4 students) should supply me with a

contract signed by all team members. The contract must be spooled or typed and should minimally cover the following:

- Organizational structure of team (democratic/chief programmer/hierarchical.)
- Time and place for meetings.
- An agreement to share files, documents, and protocols which are related to the project.
- Specification of grading method, either individual grades or one grade for all team members.
- A contingency plan for loss of members.
- A rough term project schedule

Each team should maintain a log of time spent on term project activities with each entry records the time, place and the nature of the team activities plus the names of the participated members. This team log is expected to hand in with the rest of the documents at the end of the semester.

B. Term project selection

a. A real world Registrations System
b. Any real software project upon agreement between the instructor and the term members.

C. Term project documents

The following documents are required to hand in during the project:

a. Project Plan.
b. Preliminary User's Manual and Software Requirement Specifications.
c. Architectural Design Specifications and Detailed Design Specifications.
d. Final User's Manual.

9. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student Handbook on the University web-site or in the University catalog.

10. Attendance, Absence, Lateness, Incomplete:

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A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Warning: Any cheating and plagiarism will result in a failing grade in the course.

11. Course Outline:

Week 1	An overview of software engineering The impact of software	Ch. 1
Week 2	The software crisis Computer system engineering	Ch. 5
Week 3	Discussion of group project Software and management metrics Project planning	Ch. 2, 3, 4
Week 4	Analysis fundamentals	Ch. 6
Week 5	Data flow techniques Object-oriented analysis	Ch. 7, 8
Week 6	Midterm	
Week 7	Data modeling, formal methods	Ch. 9
Week 8	Elements of software design Architectural, Data and Procedural Design	Ch. 10
Week 9	Data flow oriented design	Ch. 11
Week 10	Object-oriented design Data-oriented design	Ch. 12, 13
Week 11	Interface design CASE tools	Ch. 14,22
Week 12	Final Exam	

12. Course Outcome:

This course will serve to broaden the student's understanding of the issues and latest developments in the area of software development and maintenance. To reach this goal, the following objectives need to be met:

1. Define the current state of software development and maintenance characterized as "the software crisis".
2. Understand the multidimensional aspect of software engineering which is the current best attempt at solving the software crisis.

3. Become familiar with popular models of the software development and maintenance process.
4. Using the waterfall model, study the inputs, outputs, and processes present in each phase.
5. Study the core concepts present in several popular methodologies and be able to identify strengths and weaknesses of each.
6. Study existing CASE tools to be able to identify opportunities to automate tasks through the use of such tools.
7. Consider the issues and techniques present in confidence gaining measures residing in each phase of the software lifecycle.
8. Briefly investigate problems present in project management.

13. Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

14. Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the counselor for special needs.

15. The Learning Environment:

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Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 545
Course Title:	Programming Languages Topic: Java
Credit Hours:	3
Prerequisite:	CSC 540
Term:	WI 2019
Class Time:	Thursday 14:00-17:45
Class Room:	4
Instructor:	[redacted]
Office Hours:	F 9:00 – 12:00
Telephone:	
E-Mail:	[redacted]

2. COURSE DESCRIPTION

This course provides an overview to basic concepts and techniques of programming in Java, It focuses on the fundamental areas of software development: syntax, control-flow mechanisms, keyboard and mouse interactions, object modelling, and debugging. Topics covered include the Java language syntax, object oriented programming using Java, exception handling, file input/output, threads, collection classes, and networking.

3. TEACHING PROCEDURE

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. TEXT

Core Java 2: Vol. 1 – Fundamental, 6th ed. ISBN-13: 978-0130471772, Preston Publishing.

5. COURSE REQUIREMENTS/GRADING

1. Mid-term examination
2. Final examination
3. Completion of all written and oral assignments
4. Active class participation
5. Regular class attendance

Final Grand:

Mid-Term Examination	40%
Final Examination	40%

Final Project 20%

The course grades are assigned as:

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C
Below 70%	=	F

Note: Scores and grades will not be "curved." Therefore, any number of students in this course can earn a score of 100 (or 0) on quizzes or exams; and any number of students can earn a grade of A (or F.) By using the preceding factor, a student should constantly be aware of his/her potential final grade in the course. Students are welcome to discuss with the professor regarding to his/her progress or any aspects of the course.

Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

6. Final Project:

Starting back in the early 1990's with the introduction of Java to the computer scene there has been many updates and advances in how languages interact with web based programs. In this paper we are going to highlight several areas of several different Java flavors. The flavors we are addressing are Java, JavaScript, Java Applets and JavaBeans.

7. Classroom Policies:

Policies regarding to the University academic policies. You can get them from the Student's Handbook on the University web-site or in the University catalog.

8. Attendance, Absence, Lateness, Incomplete:

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A course grade of "incomplete" will be given under very unusual circumstances, and only if the student has complete at least 75% of the assigned work by the last day of class and only when an incomplete contract is signed and approved.

Warning: Any cheating and plagiarism will result in a failing grade in the course.

9. CLASS CALENDAR AND SCHEDULE OF DUE DATES

WEEK	MATERIAL COVERED
1	Java Intro
	Basic Java Syntax
	Arrays, Strings, Control Structures
2	Classes (1): members, this, constructors, packages
	Classes (2): References & Static
	Conceptual OO Definition
	Inheritance
	Interfaces
	Clone
3	Some JDK 1.1 API
	Javadoc
	Using New Features
	JDK 1.2 Collections
	Exceptions
4	Java IO part 1
	Java IO part 2
	Nested & Inner Classes
5	Threads, part 1
	Nested Classes Addendum
	Threads part 2
	Threads part 3
	Threads part 4
6	Midterm Exam
7	JFC Errata
	JFC Basics
	Some Graphics
8	Model-View
9	Events, Containers
10	Layouts
11	Applets
12	Final Exam

10. Course Outcome:

By the end of this course you will have:

1. mastered fundamental concepts that underlie programming language syntax and semantics through a comparative study of several languages and their features;
2. learned several new programming language features and paradigms;
3. gained the ability to study conceptual linguistic issues without being blinded by a particular language's implementation; and
4. gained insight into the problem of designing new languages.

11. Academic Honesty:

It is assumed that all students have familiarized themselves with the university's policy on and definition of academic dishonesty. All work should be the student's own - academic honesty is expected of everyone. Those who do not adhere to university and professional expectations with respect to this will be dealt with in accordance with college policy. In general – students will receive a 0 on their work if they either submit work that isn't their own (including cutting and pasting content from the Internet without proper citation) or allow other students to use their work. A second instance results in failure of the course.

12. Special Needs and Accommodations:

Please address any special problems or needs at the beginning of the quadmester with the instructor. If you are seeking accommodations based on a disability, you should provide a disability data sheet, which can be obtained from the student services office.

13. The Learning Environment:

Reagan National University is committed to providing a positive learning environment in which students of all ages and backgrounds can learn together in a setting that encourages the free exchange of ideas and information. To accomplish this goal, the members of the RNU Board have established the following expectations for learning.

- All backgrounds and cultures are respected.
- During class discussions, everyone feels welcome to participate and a free exchange of ideas takes place.
- All members of the class arrive on time and leave the class only on breaks or in case of emergency.
- Distractions are kept to a minimum. Cell phones and other electronic devices are turned off in class, labs, and library. Students remain seated throughout class and refrain from talking with classmates while another class member or the instructor has the floor.
- Each student turns in work that is his or her own.
- Consideration is always given to other classes that are taking place in adjoining classrooms.
- At the end of a class, the members of the class and the instructor leave the classroom in good condition so that the next class can begin without disruption.

Reagan National University Library Services:

RNU's online collection contains over 60,000 volumes comprised of books, journals, videos, and faculty created resources. The Library Research Portal (library@rnu.edu) provides access to multiple services and authoritative resources for academic research including books, articles, texts,

visual media, and teaching resources. Appropriate sources include scholarly and peer-reviewed journal articles, scholarly books, and well-respected news magazines and newspapers. The Library offers a large number of appropriate sources and each student is required to attend an online Library orientation. Assistance is available to help students select and locate appropriate sources when RNU is open. The online library is available to students 24 hours 7 days a week. All students can connect to the online library through the computers and laptops available at home and on campus. Each student must use their own pass code to access the library.

As an RNU student, you are required to use the RNU online library, as one source, to assist you in completing a required research paper or project.

Reagan National University

Syllabus

1. Administrative Information:

Course Number:	CSC 552
Course Title:	Computer Graphics
Credit Hours:	3
Prerequisite:	CSC 511
Term:	WI 2019
Class Time:	TU 9:00 – 12:45
Class Room:	1
Instructor:	[redacted]
Telephone:	
E-Mail:	[redacted]

2. Catalog Description:

The course is an introduction to theory and praxis of computer graphics. It covers the fundamental concepts and terminology for creating and editing basic electronic paint and draw-type graphics. It introduces techniques for 2D and 3D computer graphics, including modeling and representation, illumination and shading, rendering, texturing, and advanced software tools.

3. Teaching Procedures:

Teaching procedures for this course will include professional lectures, class discussions, reading assignments and examinations.

Participation in Class Discussion

Class participation is a very important part of the learning process in this course. Although not explicitly graded, you will be evaluated on the QUALITY of your contributions and insights. Quality comments possess one or more of the following properties:

- Offers a different and unique, but relevant, perspective;
- Contributes to moving the discussion and analysis forward;
- Builds on other comments;
- Transcends the "I feel" syndrome. That is, it includes some evidence, argumentation, or recognition of inherent tradeoffs. In other words, the comment demonstrates some reflective thinking.

We will use our assessment of your participation to manage borderline grades. While your participation grade is subjective, it will not be random or arbitrary. And, clearly, more frequent quality comments are better than less frequent quality comments.

4. Text:

Angel, Edward, *Interactive Computer Graphics*, 5th Edition, Addison-Wesley Longman, ISBN-13: 978-0321535863.

5. Course Requirements:

The quadmester grade will be based upon assignments issued in class, which might involve some small programming exercises (20%), term project (20%), midterm (20%) and a comprehensive final examination (40%). 25% credit per day will be deducted from late homework or project submissions.

The course grades are assigned as:

90 – 100%	=	A
80 – 89%	=	B
70 – 79%	=	C

Below 70% = F

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Computer laboratory

Computer laboratory assignments are designed to supplement and reinforce skills acquired in the particular course which lists this course as a co requisite. In this course, there is an in-class lab component attended by the faculty. Usually, about 30% of class time is dedicated to lab. Faculty will be around when the students are doing their lab assignments.

6. Term Project:

Term project requires students to write a report on "Image-based Rendering and Animation". This paper shall develop new hybrid rendering and animation techniques combining the advantages animation flexibility of Computer Graphics with the photorealism of real images and videos. You shall use images and video snippets for subtle details and classic CG models for coarse animation yielding highly photorealistic animations with low complexity.. The paper is expected to be between 8 and 10 pages in length, including front and back matter. Sections of the paper will be developed throughout the course.

7. Classroom Policies:

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8. Attendance, Absence, Lateness, Incomplete:

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Warning: Any cheating and plagiarism will result in a failing grade in the course.

9. Course Outline:

Week	Topics	Reading Assignments
1	Introduction: History of computer graphics, graphics	Ch. 1

	architectures and software, imaging: pinhole camera, human vision, synthetic camera, modeling vs rendering	
2	OpenGL: architecture, displaying simple two-dimensional geometric objects, positioning systems, working in a windowed environment	Ch. 2
3	Color: Color perception, color models (RGB, CMY, HLS), color transformations. Color in OpenGL. RGB and Indexed color	Ch. 3
4	Input: working in a network environment, client-server computing; input measure, event, sample and request input, using callbacks, picking.	Ch. 4
5	Geometric transformations: affine transformations (translation, rotation, scaling, shear), homogeneous coordinates, concatenation, current transformation and matrix stacks.	Ch. 5
6	Midterm Exam	
7	Three dimensional graphics: classical three dimensional viewing, specifying views, affine transformation in 3D, projective transformations.	Ch. 6
8	Ray Tracing. Shading: illumination and surface modeling, Phong shading model, polygon shading.	Ch. 7, 8
9	Rasterization: line drawing via Bresenham's algorithm, clipping, polygonal fill, BitBlt. Introduction to hidden surface removal (z buffer).	Ch. 9
10	Discrete Techniques: buffers, bitblt, reading and writing bitmaps and pixelmaps, texture mapping, compositing.	Ch. 10
11	Advanced Topics.	Ch. 11, 12
12	Final Exam	

10. Course Outcome:

By the end of this course:

- Students will have an appreciation of the history and evolution of computer graphics, both hardware and software. Assessed by written homework assignment.
- Students will have an understanding of 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations. They will be able to implement these. Assessed by tests and programming assignments.
- Students will understand the concepts of and techniques used in 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture mapping. Students will be exposed to current computer graphics research areas. Assessed by tests, homework and programming assignments.